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FORM PTO 1200	PARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER					
(REV. 11-2000)							
TRANSMITTAL LETTER		0104-0374P					
DESIGNATED/ELECTE		US APPLICATION NO (If known, see 37 CFR 1 5)					
CONCERNING A FILING	G UNDER 35 U.S.C. 371	10/049228					
INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED					
PCT/SE00/01163	June 6, 2000	June 29, 1999					
TITLE OF INVENTION	TITLE OF INVENTION HOSE						
APPLICANT(S) FOR DO/EO/US	RYHMAN, Morgan						
Applicant herewith submits to the United States	Designated/Elected Office (DO/EO/US) the foll	owing items and other information.					
1. This is a <b>FIRST</b> submission of items conce		C 371					
	omission of items concerning a filing under 35 U.S						
3. This express request to begin national	examination procedures (35 U.S.C. 371(f)) at applicable time limit set in 35 U.S.C. 371(b)	and PCT Articles 22 and 39 (1)					
	tion of 19 months from the priority date (Artic						
		, ic 51).					
5. A copy of the International Application		Burren) WO 01/01020					
	d only if not transmitted by the International	Bureau). WO 01/01029					
b. has been transmitted by the Int							
	on was filed in the United States Receiving O						
6. An English language translation of t	he International Application as filed (35 U S.C	C. 371(c)(2)).					
a is transmitted herewith.							
b. has been previously submitted	under 35 U S.C. 154(d)(4)						
<b>7.</b> Amendments to the claims of the Inte	rnational Application under PCT Article 19 (3	35 U.S.C. 371(c)(3))					
a. are transmitted herewith (requi	red only if not transmitted by the Internationa	l Bureau).					
b. have been transmitted by the Ir	iternational Bureau.						
c. have not been made, however,	the time limit for making such amendments h	as NOT expired					
d. 🕅 have not been made and will no	ot be made						
	e amendments to the claims under PCT Artic	le 19 (35 U S C 371(c)(3))					
9. An oath or declaration of the invento							
10. An English language translation of th	e annexes of the International Preliminary Ex	amination Report under PCT Article 36					
(35 U.S.C. 371(c)(5)). Items 11. to 20. below concern document(s)	or information included:						
11. An Information Disclosure Statemen (PCT/ISA/210) with 5 cited document		19(s), and International Search Report					
	ig A separate cover sheet in compliance with	37 CFR 3.28 and 3 31 is included.					
13. A FIRST preliminary amendment.	.0builde						
14. A SECOND or SUBSEQUENT preli	minary amendment						
<b>15.</b> A substitute specification.	initial y amonantona						
	raddress letter						
16. A change of power of attorney and/or	uence listing in accordance with PCT Rule 13	ter 2 and 35 U.S.C. 1 821-1 825					
	national application under $35 \text{ USC}$ $154(d)(4$						
	ge translation of the international application	under 55 U S.C. 154(0)(4)					
<b>20.</b> Other items or information.	ation Report (PCT/IPEA /400)						
1.) International Preliminary Examin 2.) Three (3) Sheets of Formal Darwi							

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21. The following fees	s are submitted				CAI	CULATION	S P	TO USE ONLY
BASIC NATIONAL	FEE (37 CFR 1.492(a	)(1)-(5):						
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1.137(a) or (b)) must	be filed and granted	to restore the app	lication to pend	ling status.	, a pe		C (37 C	
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Form PTO-1390 (REV 11-2000) page 2 of 2

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# **10/019228 JC13 Rec'd PCT/PTO** 28 DEC 2001

PATENT 0104-0374P

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant:	RYHMAN, Morgan				
Int'l. Appl. No.:	PCT/SE00/01163				
Appl. No.:	New	Group:			
Filed:	December 28, 2001	Examiner:			
For:	HOSE				

#### PRELIMINARY AMENDMENT

#### BOX PATENT APPLICATION

Assistant Commissioner for Patents December 28, 2001 Washington, DC 20231

Sir:

The following Preliminary Amendments and Remarks are respectfully submitted in connection with the above-identified application.

#### AMENDMENTS

#### IN THE SPECIFICATION:

Please amend the specification as follows:

Before line 1, insert --This application is the national phase under 35 U.S.C. § 371 of PCT International Application No. PCT/SE00/01163 which has an International filing date of June 6, 2000, which designated the United States of America and was published in English.--

#### IN THE CLAIMS:

Please amend the claims as follows:

4. (Amended) A medium-carrying hose according to claim 1, c h a r a c t e r i s e d in that the expansion portion is a groove in the hose casing when this is in an unexpanded state.

8. (Amended) A medium-carrying hose according to claim 5, c h a r a c t e r i s e d in that the cross-sectional shape of the groove is different in different parts of the hose.

9. (Amended) A medium-carrying hose according to claim 1, c h a r a c t e r i s e d in that the hose has at least two expansion portions, which are uniformly distributed along the circumference of the hose casing.

10. (Amended) A medium-carrying hose according to claim 1, c h a r a c t e r i s e d in that the hose has four wall portions in addition to four expansion portions, which are alternatingly arranged along the circumference of the hose casing.

11. (Amended) A medium-carrying hose according to claim 1, c h a r a c t e r i s e d in that the hose along its circumference is provided with an elastic material.

12. (Amended) A medium-carrying hose according to claim 1,

c h a r a c t e r i s e d in that the hose along its inner circumference is provided with an elastic material.

16. (Amended) A method according to claim 13, c h a r a c t e r i s e d in that the form material is an elastic material, which extends along the circumference of the hose material.

18. (Amended) A method according to claim 13, c h a r a c t e r i s e d in that the form material is removed from the hose material in order to form the completed hose.

#### REMARKS

The specification has been amended to provide a crossreference to the previously filed International Application.

The claims have been amended to delete improper multiple dependencies.

Entry of the above amendments is earnestly solicited. An early and favorable first action on the merits is earnestly solicited.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

mey // mey #32,334 McKinney

P.O. Box 747 Falls Church, VA 22040-0747 (703) 205-8000

KM/rem 0104-0374P

Attachment: VERSION WITH MARKINGS TO SHOW CHANGES MADE

# VERSION WITH MARKINGS TO SHOW CHANGES MADE

The specification has been amended to provide a crossreference to the previously filed International Application.

#### IN THE CLAIMS:

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The claims have been amended as follows:

4. (Amended) A medium-carrying hose according to [any one of claims 1-3] <u>claim 1</u>, c h a r a c t e r i s e d in that the expansion portion is a groove in the hose casing when this is in an unexpanded state.

8. (Amended) A medium-carrying hose according to [any one of claims 5-7] <u>claim 5</u>, c h a r a c t e r i s e d in that the cross-sectional shape of the groove is different in different parts of the hose.

9. (Amended) A medium-carrying hose according to [any one of claims 1-8] <u>claim 1</u>, c h a r a c t e r i s e d in that the hose has at least two expansion portions, which are uniformly distributed along the circumference of the hose casing.

10. (Amended) A medium-carrying hose according to [any one of claims 1-9] <u>claim 1</u>, c h a r a c t e r i s e d in that the hose has four wall portions in addition to four expansion portions, which are alternatingly arranged along the circumference of the hose casing.

11. (Amended) A medium-carrying hose according to [any one of claims 1-10] <u>claim 1</u>, c h a r a c t e r i s e d in that the hose along its circumference is provided with an elastic material.

12. (Amended) A medium-carrying hose according to [any one of claims 1-10] claim 1, c h a r a c t e r i s e d in that the hose along its inner circumference is provided with an elastic material.

16. (Amended) A method according to [any one of claims 13-15] <u>claim 13</u>, c h a r a c t e r i s e d in that the form material is an elastic material, which extends along the circumference of the hose material.

18. (Amended) A method according to [any one of claims 13-16] <u>claim 13</u>, c h a r a c t e r i s e d in that the form material is removed from the hose material in order to form the completed hose.

(Rev 11/13/01)

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#### <u>HOSE</u>

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#### Field of the Invention

The present invention relates to a medium-carrying hose, preferably for pressure medium and for use in e.g. engine compartments, the wall of the hose comprising at least one wall portion which is connected with at least one expansion portion to form a continuous hose casing. The circumference of the hose is variable between a minimum value, when the expansion portion is unexpanded, and a maximum value, when the expansion portion is maximally expanded.

The invention also relates to a method for manufacturing such a hose.

#### Background Art

15 Hoses of the type that is used in engine compartments are subjected to various effects of the surroundings. For instance, they can be subjected to pressure, from inside or from outside, or to relatively powerful vibrations as the engine is running. The space for hoses 20 in motor compartments and the like is usually very limited. For an engine unit to be compact in terms of space, it is often necessary that the hoses be preformed and bent in given directions to fit between the other components of the engine. However there is one problem since 25 the hose, when pressurised, tends to move or bulge in the engine compartment. The hose may then abut against other parts of the engine body, which for instance because of their temperature may damage the hose. This situation may also arise if the hose vibrates in the operation of the 30 engine. Both pressurising and vibration besides cause a

strain to the attachment of the hose in the engine unit.

There are today a plurality of hoses which have some kind of bellows structure at their ends, thereby reducing the vibrations in the attachment of the hose. However,

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such bellow structures do not affect the motion of the various parts of the hose, which are still essentially free and can abut against neighbouring objects.

Such a hose is disclosed in e.g. EP 0 791 775, where flexible portions at the ends of the hose are combined with a rigid hose portion in the middle of the hose. Vibrations are absorbed in the longitudinal direction of the hose at the hose ends, but otherwise the hose is allowed to move freely.

### Summary of the Invention

According to the invention the above problems are solved by a hose of the type mentioned by way of introduction, the expansion portion of the tube extending

15 in the transverse and the longitudinal direction of the hose, the wall portions being displaced relative to each other in the transverse as well as the longitudinal direction of the hose as the circumference increases and the expansion portion expands.

By the expansion portion extending in the transverse and the longitudinal direction of the hose, the wall portions will be displaced in the transverse as well as the longitudinal direction when, for instance, pressurising the hose. The direction of motion of the portions during

- 25 pressurising can thus be controlled, so that there is no risk of the hose touching other components in, for example, an engine unit. The expansion portion can extend first in one then in other direction, or diagonally across the transverse and the longitudinal direction of
- 30 the hose. Also vibrations will be efficiently damped in a desirable manner when the vibrating motion of the wall portion is absorbed by the expansion portion. This means that the wall portion, and thus the hose, can be controlled in a desirable manner also in case of vibrations.

The wall and expansion portions may, if desirable, be differently formed in different parts along the hose in order to control, during expansion or vibration of the

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hose, the direction of motion of the different parts in a desirable manner. The relationships of the wall and expansion portions can also differ in different parts along the hose.

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In such a hose, which is preformed to have a certain extent in the longitudinal direction, as is often the case of hoses intended for engine compartments, the design of, and the relationships of, the wall and expansion portions in the hose casing in each part of the hose is preferably adapted to the preform of the hose in the respective parts. One and the same preformed hose can thus advantageously be provided with differently formed expansion and wall portions.

Preferably the expansion portion may consist of a groove in the hose casing when this is in an unexpanded 15 state. Such a groove is relatively easy to form by means of a design in which the expansion portion is formed in unity with the wall portion. The expansion of the groove can besides be controlled with the aid of the shape of its cross-section. 20

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Preferably the groove is helically turned seen in the longitudinal direction of the hose. The helical shape means directly that the expansion portion is oriented both in the transverse and in the longitudinal direction of the hose. Pressure and shocks in both directions are therefore efficiently absorbed by the hose.

The number of turns of the helical groove per unit of length of the hose may be varied to control the hose as desired. The groove may also have different direction of turning in different parts of the hose, or different cross-sectional shape in different parts of the hose. This results in many possibilities of variation.

Preferably the hose has one or more expansion portions, which are distributed along the circumference of the hose casing, for satisfactory distribution of the pressure and/or shock equalisation in each individual case.

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The invention also relates to a method for manufacturing a hose according to the invention, in which the hose material is extruded. In addition to the hose material and together with this, a form material is extruded which is adapted to be a preform for the hose material for the desired configuration of expansion portions and wall portions. This preform serves to facilitate the process of extrusion. When the hose material, before blowing, has a relatively small diameter, there is a great risk that parts of the hose adhere to each other. This concerns in particular the expansion portions whose dimensions in the non-blown state are relatively small. A supporting form with expansion and wall portions is formed of the form material during extrusion and prevents problems in the forming of the hose material.

The form material is suitably arranged along the outer circumference of the hose material, which gives practical advantages in the method.

Preferably the form material is accumulated in the 20 portions of the hose material which are intended to form expansion portions. These portions usually constitute formed portions such as grooves. The bulging shape which is necessary for the hose is produced by means of an elevated portion in the form material, thus a thicker por-25 tion of form material.

The form material can advantageously consist of an elastic material which extends along the circumference of the hose material. The form material of the completed hose will then be arranged along the circumference of the

- 30 hose material and provides a smooth outer face for the hose. The elasticity of the material serves to make it possible for the expansion portions still to assume an unexpanded and an expanded state. A smooth outer face round the hose is advantageous since it is easier to keep
- 35 clean than a hose with exposed expansion portions. The hose is then along its circumference provided with an elastic material.

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#### Brief Description of the Drawings

Fig. 1 shows an embodiment of a hose according to the invention.

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Fig. 2 is a cross-sectional view along line II-II of the hose in Fig. 1.

Fig. 3 is a cross-sectional view along line III-III of the hose in Fig. 1.

Fig. 4 shows a second embodiment of a hose according to the invention.

Fig. 5 is a cross-sectional view along line V-V of the hose in Fig. 4.

Fig. 6 is a cross-sectional view along line VI-VI of the hose in Fig. 4.

Fig. 7 shows a third embodiment of a hose according 15 to the invention.

Fig. 8 is a cross-sectional view along line VII-VII of the hose in Fig. 7.

Fig. 9 is a cross-sectional view of one more embodiment of a hose according to the invention.

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#### Description of Preferred Embodiments

Fig. 1 illustrates a preferred embodiment of a hose according to the invention. The hose is preformed with a plurality of bends 1, 2 and a straight central portion

25 3. The circumferential surface of the hose is formed with grooves 4 which extend along the hose. In the first bent part 1 of the hose, the grooves 4 are helically turned along the hose. In this portion 1, shocks as well as pressure can be absorbed in several directions. In the

- 30 second straight portion 3 of the hose, the number of turns of the helix per unit of length is considerably smaller, i.e. so small that the groove 4 extends essentially along the hose. In the middle of the straight portion 3, the helical groove 4 changes direction round 35 the hose in order to form in this new direction a helix having a larger number of turns per unit of length in the last, bent part 2 of the hose.
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The cross-section of the hose is shown in Fig. 2. Here the cross-sectional shape of the grooves 4 is essentially rectangular. Four grooves 4 are uniformly distributed along the circumference of the hose with wall portions 5 therebetween. In one of the end portions of the hose, the hose is smooth and without grooves 4, as shown in Fig. 3.

Fig. 4 shows another embodiment of a hose according to the invention. The helical shape of the grooves 4 is similar to that of the hose in Fig. 1. The cross-sectional shape of the grooves 4, however, is different, which is evident from Fig. 5. Here the grooves 4 form a more acute angle to the wall portions 5 and between the walls of the groove. This design can, if it is made of the same material as in the embodiment in Fig. 1, absorb

15 the same material as in the embodiment in Fig. 1, absorb greater pressure and more powerful vibrations than in the embodiment in Fig. 1 owing to the greater expansibility of the grooves.

Figs 7-8 show a hose according to the invention, which is provided with an elastic form material along its circumference. In the manufacture of the hose by extrusion, the form material serves to give the hose the desired form with expansion and wall portions. In this embodiment an elastic form material is used, which is

25 fixedly arranged on the hose and provides a smooth surface. The smooth surface can be advantageous to protect the hose from dirt. The elastic material, however, does not significantly prevent the relative movability between the portions. It is also possible to use a form material 30 which is washed away after the hose is completed. Such a

which is washed away after the hose is completed. Such a form material would then be used only in the extrusion and then be removed from the hose. The final result will then be a hose according to, for example, Figs 1-3.

It is also possible to arrange an electric material along the inner circumference of the hose. This yields the same advantages in terms of manufacture as those mentioned above, and also gives the hose a smooth inside,

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which may be advantageous for the flow through the hose. The cross-section of such an embodiment of a hose according to the invention is shown in Fig. 9.

- It goes without saying that many embodiments in addition to those described above are feasible. The shapes of the hoses and the grooves 4 can be varied in many ways. Instead of having grooves, the expansion portions can be designed in some other fashion, provided that efficient expansibility is obtained. For instance,
- 10 the expansion portions 4 can be made of an elastic material which is put together with the wall portions 5, or of a weakened area which owing to its thinner wall thickness will be more elastic than the surrounding wall portions 5. By varying the above different parameters, the
- 15 hose portions can thus be made to be displaced in the desired direction in pressurising or in case of vibrations. Of course, the preform of the hose can also be of a different design, according to the purpose of the hose. It should also be noted that a hose according to the
- 20 invention, thanks to the expansion portions, can be made flexible. Also the direction of the flexibility is then dependent on the relationship of the expansion portions 4 and the wall portions 5.

Hoses according to the invention may also be pro-25 vided with certain parts without any vibration-absorbing arrangements whatever.

Although the embodiments described above constitute hoses with a groove having a varying direction of turning in different parts of the hose, it is possible to have the same direction of turning along the entire hose. The cross-sectional shape may also be varied or constant along the hose, according to the requirements in the individual case. The hose can have one or more expansion portions, which can be uniformly or irregularly arranged.

It is also possible to have hoses where an elastic material is arranged both on the outer and on the inner circumference of the hose. The arrangement of elastic

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#### PCT/SE00/01163

material can be optimised for manufacture of the hose, for the flow therethrough as well as for cleaning. The effect of the grooves on the flow through the hose can optionally be used to control the flow. ART 34 AMDT

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# **JC13** Rec'd PCT/PTO 28 DEC 2001

04-07-2001

#### AMENDED CLAIMS

1. A medium-carrying hose, preferably for pressure medium and for use in e.g. engine compartments, the wall of the hose comprising at least one wall portion (5) 5 which is connected with at least one expansion portion (4) to form a continuous hose casing, so that the circumference of the hose is variable between a minimum value, when the expansion portion (4) is unexpanded, and 10 a maximum value, when the expansion portion (4) is maximally expanded and said expanded portion (4) extends in the transverse and the longitudinal direction of the hose, the wall portions (5) being displaced relative to each other in the transverse as well as the longitudinal direction of the hose as the circumference increases and 15 the expansion portion (4) expands, characterised in that the wall and expansion portions (5, 4) are differently formed in different parts (1, 2, 3) along the 20 hose in order to control, during expansion or vibration of the hose, the direction of motion of the different parts (1, 2, 3) in a desirable manner.

2. A medium-carrying hose according to claim 1, character.ised in

- 25 that the relationships of the wall and expansion portions (5, 4) are different in different parts along the hose (1, 2, 3) in order to control, during expansion of the hose, the direction of motion of the different parts (1, 2, 3) in a desirable manner.
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3. A medium-carrying hose according to claim 1 or 2, characterised in

that the hose is preformed to have a certain extent in the longitudinal direction, and that the design of, and the relationships of, the wall and expansion portions (5, 4) in the hose casing in each part of the hose is adapted to the preform of the hose in the respective parts (1, 2, 3) of the hose.

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4. A medium-carrying hose according to any one of claims 1-3, characterisedin that the expansion portion is a groove in the hose casing when this is in an unexpanded state. 5 5. A medium-carrying hose according to claim 4, characterisedin that the groove is helically turned seen in the longitudinal direction of the hose. 10 6. A medium-carrying hose according to claim 5, characterisedin that the helical groove has a varying number of turns per unit of length of the hose. 7. A medium-carrying hose according to claim 5 or 6, characterisedin 15 that the helical groove has different direction of turning in different parts of the hose. 8. A medium-carrying hose according to any one of claims 5-7, characterised in 20 that the cross-sectional shape of the groove is different in different parts of the hose. 9. A medium-carrying hose according to any one of claims 1-8, characterisedin 25 that the hose has at least two expansion portions, which are uniformly distributed along the circumference of the hose casing. 10. A medium-carrying hose according to any one of claims 1-9, 30 characterisedin that the hose has four wall portions in addition to four expansion portions, which are alternatingly arranged along the circumference of the hose casing. 35

The Swedian Patent Office

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ART 34 AMOT

11. A medium-carrying hose according to any one of claims 1-10, characterisedin that the hose along its circumference is provided with an elastic material. 5 12. A medium-carrying hose according to any one of claims 1-10, characterisedin that the hose along its inner circumference is provided with an elastic material. 10 13. A method for manufacturing a hose according to claim 1 by extruding the materials forming the hose, characterisedby extruding, in addition to the hose material and together with this, a form material, which is adapted to be a 15 preform for the hose material for the desired configuration of the expansion portions and wall portions. 14. A method according to claim 13, characterisedin 20 that the form material is arranged along the outer circumference of the hose material. 15. A method according to claim 13 or 14, characterisedin that the form material is accumulated in the portions of 25 the hose material which are adapted to form expansion portions. 16. A method according to any one of claims 13-15, characterisedin that the form material is an elastic material, which 30 extends along the circumference of the hose material. 17. A method according to claim 16, characterisedin that the form material in the completed hose is arranged along the circumference of the hose material and provides 35 a smooth outer face for the hose.

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18. A method according to any one of claims 13-16, c h a r a c t e r i s e d in that the form material is removed from the hose material in order to form the completed hose. 19. A method according to claim 18, c h a r a c t e r i s e d in that the form material has the property that it can be washed away from the hose material.

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ART 34 AMDT



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- (54) Title: HOSE П

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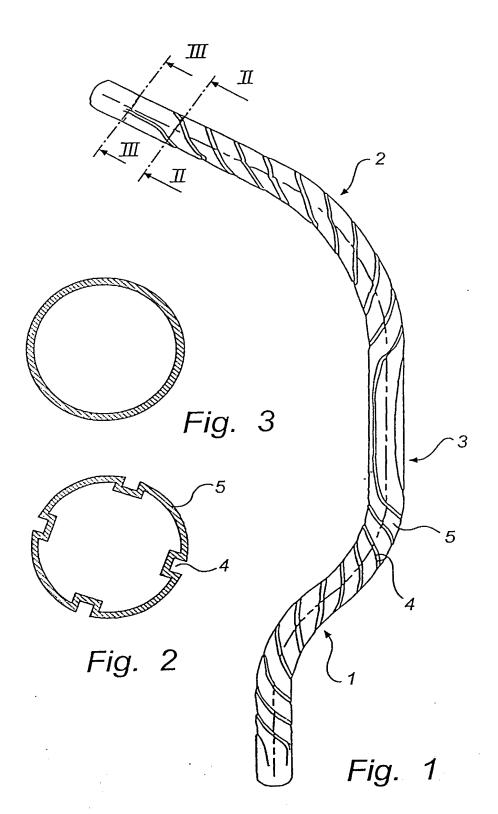
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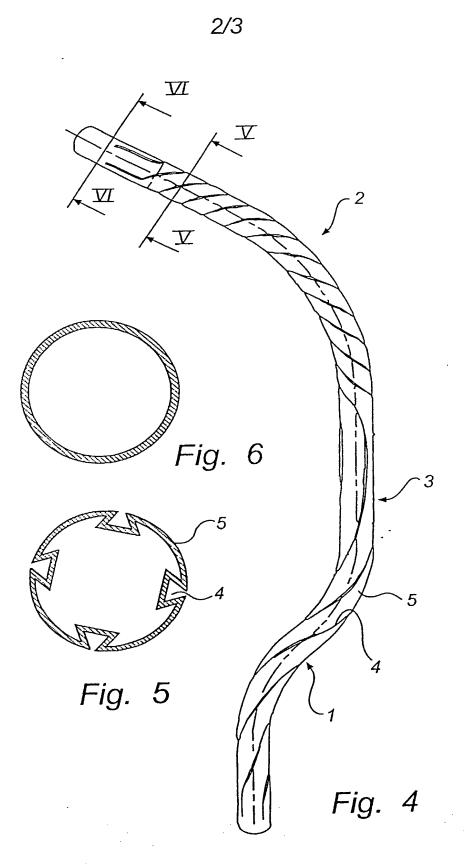
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(57) Abstract: The present invention relates to a medium-carrying hose, preferably for pressure medium and for use in, for instance, an engine unit, the wall of the hose comprising at least one wall portion (5). The wall portion (5) is connected with at least one expansion portion (4) to form a continuous hose casing, so that the circumference of the hose is variable between a minimum value, when the expansion portion (4) is unexpanded, and a maximum value, when the expansion portion (4) is maximally expanded. The expansion portion (4) extends in the transverse and the longitudinal direction of the hose, the wall portions (5) being displaced relative to each other both in the transverse and in the longitudinal direction of the hose as the circumference increases and the expansion portion (4) expands. The invention also relates to a method for manufacturing such a hose.

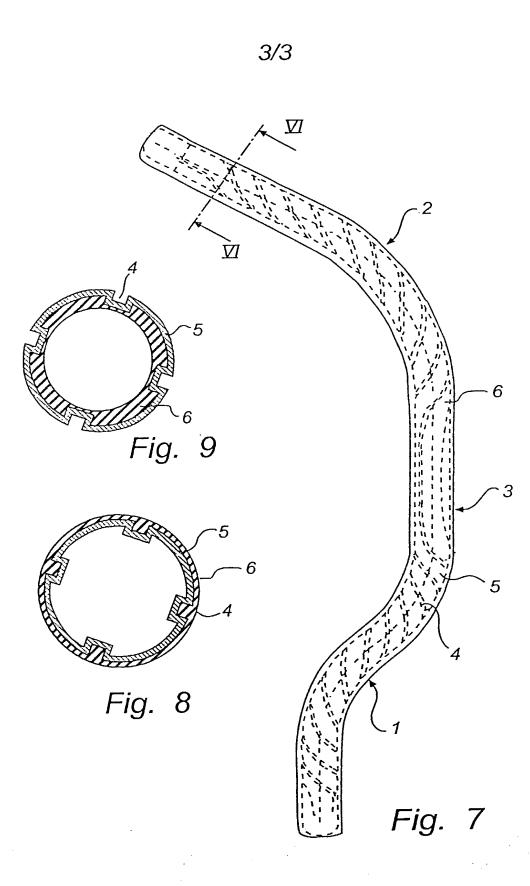
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	International Application Number PCT/SE00/01163	; and was
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	<u>9903626-1</u> (Number)	<u>Swden</u> (Country)	October 8. (Month/Day/Y		⊠ Yes	D No
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	the subject matter of ea provided by the first par patentability as defined	fit under Title 35, United States Code, §12 ch of the claims of this application is no agraph of Title 35, United States Code, in Title 37, Code of Federal Regulations, international filing date of this application	ot disclosed in the pri §112, I acknowledge §1.56 which became	ior United States and/or P the duty to disclose inform	CT application nation which is	in the manner material to the
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Page 1 of 2 (Rev. 06/29/01)	(Application Number)	(Filing Date)		(Status - patented, pendir	ig, abandoned)	

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Insert Post Office Address →	MAILING ADDRESS (Complete Street Address m	cluding City, State & Country)		
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